Butler University
Digital Commons @ Butler University

Scholarship and Professional Work – Education
College of Education

2011

Have a Kids Inquiry Conference: Putting a Twist on the Typical Science Fair

Paula A. Magee

Ryan Flessner
Butler University, rflessne@butler.edu

Have a kids inquiry conference! Putting a twist on the typical science fair

Science and Children, April-May 2011

In school, the traditional format for the formal sharing of science experiences has been the science fair. Although the format of science fairs may vary, the usual components consist of a step-by-step experimental process that students follow as they test different variables, construct a hypothesis, and collect data to support or disprove their hypothesis. Usually the science fair is conducted as a competitive event at which prizes are awarded for the "best" examples. Unfortunately, this type of science event has little connection to the real sharing that scientists do regularly.

The National Science Education Standards (NSES) call for an approach to science that honors the scientific processes in which scientists actually engage (NRC 1996). A careful look shows that practicing scientists share informal talk daily and deliberately prepare for more formal sharing of their work through participation in professional conferences. Unlike the school science fair, the professional science conference is a noncompetitive place where scientists interact and share ideas. Work that is in process is often presented, and the giving and receiving of feedback is an integral part of the conference.

One alternative to the traditional school science fair is a Kids Inquiry Conference (KIC; Saul et al. 2005). More along the lines of the professional science conference, a KIC encourages students to develop their own inquiry projects, carry them out using an inquiry-based model, and prepare for a public sharing event. In addition, preparing for and participating in a KIC can be a powerful professional development (PD) experience for teachers. In this article, we describe preparing for, implementing, and reflecting on the KIC that we--university faculty collaborating with elementary teachers--organized with 250 students and 12 teachers from two elementary schools. We'll focus on the conference logistics--you bring the inquiry!

[ILLUSTRATION OMITTED]

Initiating the Process

Saul et al. (2005) described the most difficult aspect of the KIC as identifying an inquiry project and helping teachers and students understand the inquiry process. One way to facilitate this is through teachers and university faculty working together over time. Often classroom teachers and university professors interact during professional development events. These events present great opportunities to engage in discussions about possible KIC collaborations.

We were fortunate enough to be able to do this. In our case, the teachers were involved in a yearlong professional development experience that supported their development of the inquiry process. Over the course of the year, teachers engaged in varying degrees of inquiry, but all were able to have their students engage in the end-of-year KIC. The main learning outcomes for this PD experience were for teachers to learn more about inquiry-based teaching and to better understand how to create opportunities for students to engage in inquiry.

The teachers met with one of us every two to three weeks to discuss the idea of inquiry-based teaching and how it could play out in individual classrooms. Although they were in close geographical proximity, the teachers were also in contact with us via e-mail between PD sessions. This arrangement encouraged the teachers to communicate their needs to us, so we could supply just-in-time support. These needs included classroom materials, coteaching support, and time to discuss classroom strategies for inquiry-based teaching. This structure also encouraged the teachers to try out different techniques and activities and practice with inquiry-based teaching before committing to a full-blown inquiry project. The best PD experiences are often those where there is a long-term commitment between the partners. Committing to a KIC encouraged this type of relationship.

Teachers at the schools enacted different levels of inquiry and varied in the amount of science they were teaching. With respect to inquiry, some were new to the concept and needed to ease themselves into the process, whereas others were more experienced with inquiry-based teaching and learning. With regard to teaching science, some teachers taught science 3-4 times per week; yet others were struggling to find time to teach science at all. This diversity in experience resulted in many different forms of inquiry-based teaching--structured inquiry, guided inquiry, or open inquiry (Banchi and Bell 2008)--as well as many different kinds of projects at the KIC.

Conference Basics

Students knew about the conference from the beginning of the project. We visited each class and discussed with the students what the conference would look like and how they would be able to share their work with students from their school and from other schools. At the beginning of the process students were mostly curious about where the conference would be and if they would need to present in front of a large group of people. We were able to reassure them that although they would be sharing their work, the venue would be much more comfortable than standing in front of a group of 200 people. Because of this, students and teachers were aware of the importance of documentation. All those involved kept science journals, took photographs, constructed research logs, and designed posters to document their learning. This allowed the students to share their processes with others in an effort to communicate their learning with an outside audience. In each of the settings where we worked, students were encouraged--from the get-go--to document.

Unlike the traditional science fair, at which students follow a scripted procedure and mostly collect data and organize it to support or refute a hypothesis, the KIC allows the students to mimic the actions of real-life scientists by iteratively questioning, collecting data, and re-addressing working explanations that are developed by the students. These working explanations are continuously challenged by reading appropriate materials throughout the investigation. These print materials were both offered by the teacher and found by the students.

Sample Projects

Two teachers with whom we worked engaged in an eight-week project on composting. They had their fourth-grade students develop complex questions to investigate after observing a teacher-made compost bin. In these classes, the teachers introduced the compost bin as a thinking starter (Magee and Barman 2009). They did so to engage the students and encourage them to generate questions that were of interest to them. Because the students were engaged in a relatively long inquiry project, there was time for complex questions to develop. Because the teachers were attentive to teaching process skills (e.g., observation, inference, controlling variables) as part of the project, students were able to see and discuss how the process skills helped them make sense of the work they were doing. Because the teachers in these two classrooms wanted to keep all students within the same content area, children were supported in making choices based on the compost bin. In this way, the teachers were able to offer a student-driven project (fourth graders developed different questions in their different work groups), but the teachers also had some control of the scope of the projects by grounding them in grade-specific content (i.e., composting, recycling, and plants). This arrangement worked well for both the teachers and the students.

In another fourth and fifth-grade multiage classroom, students were encouraged to generate questions about anything that interested them. Ideas were diverse and students in the class were ultimately grouped according to areas of interest. In this class, a variety of projects was presented was at the KIC highlighting concepts as diverse as vegetarianism, rocketry, and video games.

In one remarkable project, a young girl chose to study Alzheimer's disease in an effort to reconnect with a grandparent who was suffering with its onset. During her investigation the student learned more about the causes of Alzheimer's disease and understood more completely how to interact with people suffering from it. Through an iterative process of questioning, reading, and interacting with her grandfather the student was better able to understand the disease and improve her interactions with her relative.

In each case, students were encouraged to draw from their own life experiences and interests to design an experience that engaged them in the inquiry process. In this classroom, the teacher prioritized student ownership by allowing the children to develop their inquiries into meaningful projects. Similarly, students learned about data collection and became proficient at identifying information that would help them make sense of their experiences.

We are not saying that one of these scenarios is better than the other. Rather, what matters most is that teachers identify their own particular goals (and comfort level with inquiry-based science) and figure out how to make those goals a reality. There are many alternatives for teachers to choose from, although it would be impossible for us to explore all of the possibilities and details of initiating inquiry here.

Preparing for the Conference

Two weeks before the conference, teachers engaged the students in planning how they would share their work. Most of the groups (most classes were divided into groups of four students, although there were two whole-class projects and a few pairs) decided that they would prepare a display board that could be easily transported to the conference site. One of the teachers worked with the students to develop a list of items to include on the display board (Figure 1). This list illustrates an understanding of the complexity of the inquiry process. For example, the decision to include big questions helps us to see how the teacher and her students saw connections beyond a single science experiment. In addition, the inclusion of a space for more questions indicates an awareness of the ongoing nature of the inquiry process. Last, the inclusion of a variety of ways to document results and processes (e.g., photographs, illustrations, graphs, and pictures) reinforces the idea that there are multiple documentation modes that are appropriate. During their sharing time students were able to use their display boards as effective visual aids. Because many of the students were new to presenting, the display boards also acted as a concrete aid for them to refer to during their sharing.

```
Figure 1. Display board items. 1. Title with "big questions" underneath photographs, illustrations, pictures, and graphs 2. Timeline: Clear day-by-day, step-by-step outline of what you did from start to finish 3. Research: Share your findings 4. Discoveries and Observations: Talk about some of the interesting things that happened during the process of your inquiry 5. More questions: Share some of the questions that came up through the inquiry 6. Final Question: Choose a related question that you would like to explore in the future Figure 2. Sample schedule for Kids Inquiry Conference. Welcome to our 1st Kids Inquiry Conference Schedule of Events 9:45-10:00--Sign in (School of Education Commons) 10:00-10:15--Welcome and opening remarks 10:15-10:20--Walk to assigned rooms 10:20-10:45--Open viewing of projects in assigned rooms 10:45-11:15--In-room discussions with students 11:20-11:35--Students visit other rooms, view projects, and interact (Group 1) 11:35-11:50--Students visit other rooms, view projects, and interact (Group 2) 12:00--Lunch in The Commons 12:15--Closing remarks
```

To prepare for the sharing, students were informed that they would have five minutes to give an overview of their project. They were encouraged to include the reason(s) for the investigation and how they made decisions regarding their investigative process.

Format of the KIC

One of the things everyone wanted was a conference at which students could interact with each other. Because of this, we deliberately included opportunities for students, teachers, university faculty, and other visitors to interact. The conference was held at a local university where we secured 10 college classrooms and one large general meeting space. The KIC was kicked off in the large meeting space where all 275 participants were greeted. Because the format of the KIC was different than most science fairs, where students only stand in front of their displays, we were careful to outline the schedule for the day. The teachers involved had been briefed prior to the event (Figure 2) and preservice teachers were assigned to different rooms to act as session chairs.

Three student groups (intentionally not all from one school) were placed in each classroom. Tables and chairs were available so students could set up displays and materials that they had brought with them. The schedule included three different 15-minute sharing sessions. During each session, groups took turns presenting their projects. Students were reminded that the goal was not for all projects to look the same. Rather, students were encouraged to share their questions, processes, and thinking.

Following the third sharing session, everyone in the room gathered in a discussion circle and participated in a science talk that was facilitated by the session chairs (pre-service teacher volunteers). During the science talk, students, arranged in chairs in a circle, were encouraged to share aspects of their work that were particularly significant to them (successes, challenges, results) for a few moments and then others in the circle were encouraged to ask questions to enhance the interactive nature of the discussion. The college students were ready to ask questions to get the discussion started and were time-keepers to ensure that the discussion did not run over the allotted time.

We found that these talks were productive. The students were interested in the work of their peers. The format of sharing within a room (e.g., a conference roundtable format) allowed students to interact, ask thoughtful questions, and have others validate their work.

Poster sessions are typically the most interactive components of a scientific conference. In these sessions, participants have the opportunity to circulate and view the work of others. We were able to do this by scheduling groups to move from one room to another at designated times. Following discussion circles, groups took turns visiting different rooms during the next hour of the conference. This format allowed students to interact with a variety of their peers but also made the experience manageable and organized.

What We Learned

As we write this article, our teacher collaborators are already preparing for the second KIC. Looking back over the past year, there are several things that we have learned:

Engaging in a KIC can increase communication within a school building. At one school where we worked, second-grade teachers (independently working on inquiry-based teaching) began talking more with teachers who had participated in the KIC. Inquiry as a common goal supported this communication.

Experience is helpful. Now that teachers have experienced the KIC and the inquiry process once, they are more likely to engage again. In addition, having a KIC "under their belt" has given the teachers more confidence to push themselves and their students a little harder next time.

Collaboration between elementary schools and universities helps. As university professors, we were better able to obtain funds and be flexible with our schedule to support the teachers and students. The classroom teachers were able to offer a real-life context and often reminded us of the complexity of trying to fit science into an already jam-packed school day.

Working on inquiry projects helps students develop independence. Students, supported by classroom teachers and classmates, were able to mess around with the idea of inquiry.

Involvement in a KIC increases teachers' confidence and willingness to teach science. Because of a host of demands on class time, teachers often swap science and another subject (typically social studies) as a way to maximize instructional time. However, this frequently causes teachers to neglect important aspects of both content areas. In one case, a teacher who had been trading students with another teacher to avoid teaching science (instead, she taught social studies to both classes), decided to rethink this decision after engaging in the KIC. This example alone shows the power of inquiry-based teaching and learning.

Collaborating with classroom teachers on the KIC was a wonderful experience. Although the effort involved is not insignificant, it is certainly outweighed by the benefits described--educators create more meaningful experiences for their students, children become engaged in relevant content, and science becomes more aligned with the work in which practicing scientists engage.

References

Banchi, H., and R. Bell. 2008. The many levels of inquiry. Science and Children 46 (2): 26-29.

Magee, P., and N. Barman. 2009. Developing a relationship with science through authentic inquiry. In Inquiry: The key to exemplary science, ed. R.E. Yeager, 115-126. Arlington, VA: NSTA Press.

Saul, W., D. Dieckman, C. Pearce, and D. Neutze. 2005. Beyond the science fair: Creating a kids' inquiry conference. Portsmouth, NH: Heinemann.

Connecting to the Standards

This article relates to the following National Science Education Standards (NRC 1996):

Teaching Standards Standard A:

Teachers of science plan an inquiry-based science program for their students.

Standard B:

Teachers of science guide and facilitate learning.

Content Standards Grades K-8

Standard A: Science as Inquiry

* Abilities necessary to do scientific inquiry

* Understanding about scientific inquiry

National Research Council (NRC). 1996. National science education standards. Washington, DC: National Academies Press.

Paula A. Magee (pamagee@iupui. edu) is a Clinical Associate Professor at Indiana University-Purdue University Indianapolis in Indianapolis, Indiana. Ryan Flessner is an Assistant Professor at Butler University in Indianapolis.

Magee, Paula A.^Flessner, Ryan

Source Citation

Flessner, Ryan, and Paula A. Magee. "Have a kids inquiry conference! Putting a twist on the typical science fair." *Science and Children* Apr.-May 2011: 63. *Student Resources in Context*. Web. 10 June 2015.

Document URL

http://ic.galegroup.com/ic/suic/AcademicJournalsDetailsPage/AcademicJournalsDetailsWindow?failOverType=&query=&prodId=SUIC&windowstate=normal&contentModules=&display-query=&mode=view&displayGroupName=Journals&;limiter=&currPage=&disableHighlighting=false&displayGroups=&sortBy=&search_within_results=&p=SUIC&action=e&catId=&activityType=&scanId=&documentId=GALE%7CA257512401&source=Bookmark&u=butleru&jsid=d27d5dc9ba72ea7b9bd0435fd351de2b

Gale Document Number: GALE|A257512401